THE SEPARATION OF REED WARBLERS *ACROCEPHALUS SCIRPACEUS* AND MARSH WARBLERS *A. PALUSTRIS* IN EASTERN AFRICA

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The criteria of plumage, wing structure and song on which adult Reed Warblers and Marsh Warblers may be separated are well documented in Europe (e.g. Williamson 1963, Atkin *et al.* 1965, Dowsett & Dowsett-Lemaire 1979, Dorsch 1981, Svensson 1984). During passage through the Middle East, however, and in autumn and winter quarters in Africa, the Marsh Warbler occurs together with large eastern Reed Warblers, mostly of the paler race *fuscus*. Because of this geographical variation in size and colour in the Reed Warbler, and also because of the problems posed by first autumn birds (Williamson 1963, Crudass & Devlin 1963, Atkin *et al.* 1965), the separation of the two species deserves further discussion. The difficulties of identifying Reed Warblers in southern Africa have recently been stressed by Komen (1988). This paper examines the usefulness of various criteria for separating birds in the hand, based on observations in Kenya, Uganda and Sudan. The question of field identification is considered more briefly.

METHODS

Since 1966 large numbers of both species have been caught for ringing in Kenya and Sudan, and also many Reed Warblers in Uganda. Many birds have been assigned without difficulty on the basis of plumage, but it has often been necessary to check structural details to confirm identification. Various wing, bill and/or foot measurements were taken by the author (in addition to routine wing-length) on over 650 Marsh Warblers and 600 Reed Warblers to try to establish the most useful structural separation criteria.

Wing-lengths were flattened chord measurements made to the nearest millimetre (Spencer 1972).

Other wing measurements, taken to the nearest 0.5 mm, were second primary inner web notch depth (n) and tenth primary shortfall (x), both shown in Fig. 1. The position of the second primary tip and inner web notch relative to the tips of other primaries on the closed wing were also noted. Numbering of the primaries is from the outermost inwards.

Bill dimensions: Length was measured from the tip to the rear of the nostril, and width across the rear of the nostril (Fig. 1b), both measurements being taken with callipers to the nearest 0.1 mm.

Inner footspan, the distance from the rear of the hind toe to the front of the inner toe on the flattened foot (here excluding claws) was taken to the nearest 0.5 mm. First the inner toe and then the hind toe were fully straightened, but not stretched, along the edge of a rule as shown in Fig. 1c, the middle and outer toes lying just behind the rule.

Statements in the text not supported by references or tabulated data are based on the author's own observations.

CRITERIA FOR SEPARATION IN THE HAND

Plumage wear

Reed Warblers wintering in eastern Africa renew their whole plumage there, most between October and December/January, but a few on or south of the equator between

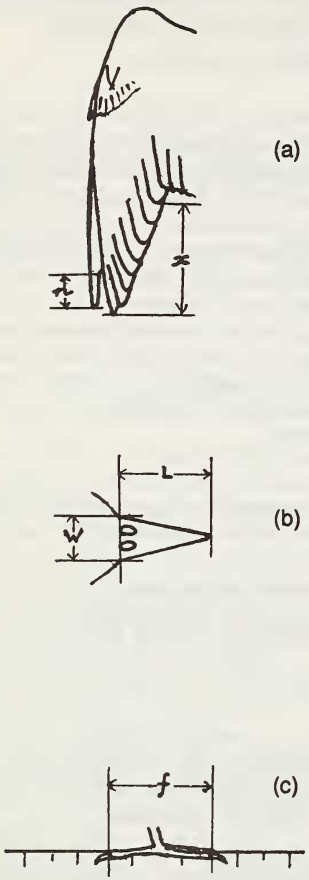

Fig. 1. *Diagrams showing measurements mentioned in the text.*

December/January and March (Pearson 1973, 1982). Most are already slightly worn on spring passage. Adults have some post-nuptial moult, for some show new plumage in Sudan in September. First autumn birds appear fresh at this time. However, prior to the main moult, adult and first autumn birds appear generally worn by November/December.

Marsh Warblers renew their whole plumage late in their stay in Africa (Hanmer 1979, Dowsett-Lemaire & Dowsett 1987). Thus, they still have blackish primaries with unworn tips on spring passage. In August/September, adults reaching Sudan show little sign of post-nuptial moult. However, an extensive partial moult occurs in Ethiopia in September/October, and adults on renewed migration through Kenya in November/December have fresh body and head plumage contrasting with worn, greyer looking wings and tail (Pearson & Backhurst 1976). First autumn birds are very fresh-looking in Sudan in September, but many are already quite worn by November, though (in contrast to adults) with the body plumage uniform with the wings.

Thus, plumage wear can help identify adult birds. In April–May, Marsh Warblers are more fresh-looking than Reed. In September, many Reed (but few Marsh) show a contrast between worn wings and newer body plumage. A similar but more pronounced contrast is shown by adult Marsh in November/December, by which time it is no longer noticeable in Reed.

Plumage colour

In freshly moulted Marsh Warblers the upperparts are rather uniform olivaceous brown with a slight greenish tinge. The underparts are washed with yellowish buff, most strongly on breast and flanks, and the creamy white throat presents a paler contrast. The wing feather edgings are uniform with the mantle, those of the tertials contrasting strongly with dark feather centres. There is little racial variation except that birds from the south-eastern extremity of the range (separated as *laricus* by Portenko (1955)) are slightly paler and greyer. Some 10 per cent of Kenya spring passage birds are distinctly more greyish green above and paler creamy below, and are presumably from this population.

Some 25 per cent of the Reed Warblers caught in Kenya and Uganda appear to be nominate birds. In fresh plumage (December–May) these are warm brown above. The

flanks and sides of the breast are suffused warm buff, but the rest of the underparts are whiter than in Marsh, without the yellowish tinge. The tertials are less bright, with the edges less well demarcated. The majority of East African birds, however, are typical *fuscus*, olivaceous brown above with a warm tinge confined to the rump and upper-tail coverts, a greyish tone to the nape and crown and whiter underparts than nominate birds. Some freshly moulted *fuscus* lack warmth in the plumage entirely, and are identical to Marsh above (and in head colour and face pattern), although whiter below. A few East African birds—perhaps 5 per cent—are uniformly greyish brown above, similar to *laricus* Marsh. In general, freshly moulted Reed are whiter below than Marsh, and most are distinguishable by a warm colouration above, at least on the rump. Colour distinctions are less useful in worn adults in early autumn, but the new body plumage of Marsh in late autumn is similar to the spring plumage, so that adults are again separable by their greenish tinged upperparts and yellow-buff underparts.

The plumage of first autumn Marsh Warblers is similar above and below to that of fresh adults, but rather brighter. Many have a warm gingery tinge to the whole upperparts, or at least the rump and uppertail coverts. This tends to wear off, but was noted on about 30 per cent of young birds on the Sudan coast in September and about 20 per cent examined in Kenya in November. This bright tone is commonly quite striking in early autumn on the wings, especially the tertials, greater coverts and primary edges. As in adults, the tertial fringes contrast strongly with dark centres. Young Reed are generally duller than Marsh, tinged rusty rather than gingery, but separation on upperpart colour may be difficult. However, they lack the yellowish underpart tinge of most young Marsh, and the tertial fringes are less contrasting.

Wing-length and structure

Measurements taken in eastern Africa (summarized in Table 1) show that wing-length is practically the same in the two species and cannot assist in identification. This is different from the situation in Europe, where Reed is a smaller bird (e.g. 67 adults in Britain averaged 64.2 mm, range 61–68 mm (author's obs.), and Dorsch (1981) gives a mean of 66.4 mm, range 61–71, for 393 East German adults). Here, Reed often measure less than 63 mm—the bottom of the Marsh range. A very few small Reeds (61–62 mm) have been found on the Sudan coast, but none in Kenya or Uganda.

The Reed Warbler tends to have a slightly more rounded wing than Marsh. The tenth primary shortfall is usually less (see Table 2) and the second primary shortfall greater (Table 3). However, these distinctions can only form a basis for identification in a few extreme cases. A more useful character, which has often been stressed in the literature (e.g. Williamson 1963, Svensson 1984) is the depth and position of the second primary inner web notch. Notch depth is typically greater in Reed than in Marsh (Table 4), and this measurement does separate many adult birds in East Africa, those measuring above 11 mm being Reed, and those less than 10.5 mm Marsh. However, notch depth is less in young Reed Warblers than in adults, so that many young birds fall into a region of overlap.

The position of the notch relative to the primary tips on the closed wing depends both on notch depth and wing roundedness. Although slightly subjective, 'notch position' thus provides a rather better separation than notch depth (Table 5). It must, however, be interpreted in conjunction with age, and primary wear should also be taken into account. In spring adults, the notch position of the two species barely overlaps at the tip of the ninth primary, but nearly all birds can be assigned. In autumn adults, with the primary tips worn, the notch falls slightly higher, and overlap is now between the tips of primaries eight and nine (those with notch equal to P9 being fairly safely Reed). In first autumn Reeds the

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Table 1. *Wing-lengths of Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *in eastern Africa. Mean ± S.D. are given for the number of birds in parentheses*

Reed Warbler				
Sudan/Kenya/Uganda	Ad	67.6 ± 8.0	61–73	(137)
Unmoulted, Aug–Dec	1Y	67.0 ± 1.9	61–73	(136)
Kenya/Uganda				
Moulted, Jan–Apr		68.3 ± 2.1	64–76	(533)
Marsh Warbler				
Kenya	Ad	68.4 ± 1.7	64–73	(384)
Unmoulted, Nov–Dec	1Y	67.9 ± 1.7	64–73	(488)
Kenya				
Moulted, Apr		69.6 ± 2.0	65–73	(77)

Table 2. *Tenth primary shortfall (distance from tip of P10 to the tip of the closed wing) in Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *caught in Kenya and Uganda. Ranges are given (measurement in mm) for the numbers of birds indicated.*

Reed Warbler			
Kenya/Uganda	Ad	22	13–16
Unmoulted, Nov–Dec	1Y	36	13–17
Kenya/Uganda			
Moulted, Jan–Apr		131	12–17
Marsh Warbler			
Kenya	Ad	50	15–18
Unmoulted, Nov–Dec	1Y	36	15–18

Table 3. *Position of the second primary tip relative to the tips of other primaries on the closed wing of Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *caught in eastern Africa. Numbers in each category are given.*

Tip of P2 falling at:		>P3	=P3	P3–4	=P4	PP4–5	=P5	PP5–6
Reed Warbler								
Sudan/Kenya	Ad	–	–	7	24	59	4	1
Unmoulted, Aug–Dec		–	4	6	21	3	1	
Kenya/Uganda								
Moulted Jan–Apr		–	–	6	33	194	22	10
Marsh Warbler								
Kenya	Ad	3	32	57	18	7	–	–
Unmoulted, Nov–Dec	1Y	1	18	151	55	43	–	–
Kenya								
Moulted, Apr		–	1	22	21	5	–	–

Table 4. *Second primary notch depth (mm) of Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *caught in eastern Africa. Means ± S.D. and ranges are given for the number shown in parentheses.*

Reed Warbler				
Sudan/Kenya	Ad	11.9 ± 0.7	10.5–13.5	(72)
Unmoulted, Aug–Dec	1Y	10.9 ± 0.7	10.0–12.5	(17)
Kenya				
Moulted, Jan–Apr		12.2 ± 0.7	10.5–14.0	(117)
Marsh Warbler				
Kenya	Ad	9.0 ± 0.7	7.5–11.0	(36)
Unmoulted, Nov–Dec	1Y	9.1 ± 0.6	8.0–10.5	(55)
Kenya				
Moulted, Apr		9.5 ± 0.5	8.5–10.5	(19)

Table 5. *Position of second primary notch relative to tips of other primaries on the closed wing of Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *caught in eastern Africa. Numbers in each category are given.*

Notch falling at primary position:	=6	6/7	=7	7/8	=8	8/9	=9	9/10	=10	10/ss	=ss
Reed Warbler											
Sudan/Kenya/ Uganda Ad	–	–	–	–	–	7	14	16	29	16	1
Unmoulted, Aug–Dec 1Y	–	–	1	3	3	12	11	12	6	6	–
Kenya/Uganda Moulted Jan–Apr	–	–	–	–	–	2	9	59	98	247	23
Marsh Warbler											
Kenya Ad	7	26	48	57	15	1	1	–	–	–	–
Unmoulted, Nov–Dec 1Y	3	34	91	169	44	20	1	–	–	–	–
Kenya Moulted, Apr	–	1	6	26	15	5	1	–	–	–	–

notch may fall as high as the eighth, and exceptionally the seventh primary tip, so that again many young birds of either species are unidentifiable on this character alone.

Birds moulting in eastern (or southern) Africa during January–March may be impossible to identify from plumage colour and notch position. In these, bill and foot measurements may be crucial (see below).

Bill measurements

The bill is rather differently proportioned in the two species, averaging longer and narrower in Reed than in Marsh (Fig. 2). The length difference is not readily apparent from conventional measurements to base of skull or feathering (see Williamson 1963,

Svensson 1984, for example), but seems to be more so in careful measurements to the rear of the nostril (Table 6). Length alone serves to identify many individuals of both species in East Africa, but a better index is provided by the length/width ratio. This overlapped at values of 2.3–2.4 with 78 per cent of Reed above this range and 73 per cent of Marsh below. Alternatively, the value of length minus twice width (L – 2W) can be used. Overlap was found at values of 1.5–1.9, with 92 per cent of Reed above this range and 83 per cent of Marsh below. This last criterion is similar to the 'Wallinder Index' suggested by Svensson (1984), but the latter incorporates tarsus width in addition to bill length (to skull) and width (as defined here). Tarsus width differs little in the two species (44 Reeds in Sudan averaged 1.82 mm (range 1.7–2.0 mm) and 80 Marsh 1.92 mm (1.7–2.1)), and considering the precision required in its measurement, its involvement probably decreases rather than increases the species separation obtainable by general use of the Wallinder Index. Bill length minus twice width, as defined above, is simpler and more precise to determine, and may give more satisfactory separation, in Europe as well as in Africa. It should be realized, however, that neither this formula nor the Wallinder Index would work satisfactorily with young juveniles, which have shorter and wider bills than adults (pers. obs.).

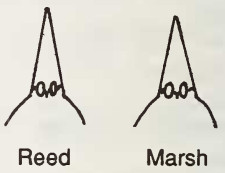

Fig. 2. *Diagram of the bills of the two species from above.*

Inner footspan

Reed Warblers have larger feet than Marsh (Leisler 1972). Leisler reported a complete separation of the inner footspan measurement of Reed and Marsh Warblers in central Europe, but Dorsch (1981) found considerable overlap in an East German study. Inner footspan (excluding claws) was checked in Kenyan birds (Table 7). Marsh Warblers ranged 16.0–18.5 mm, and Reed 17.5–21.0 mm; 65 per cent of Reed fell above the overlap region while 43 per cent of Marsh were below it. This measurement alone, though not as good as bill measurement, does identify many birds. In any case it usually gives a good additional indication independent of wing or bill structure.

Soft part colour

Marsh Warblers tend to have paler legs than Reed, usually said to be pinkish straw or pale horn. However, in almost 40 per cent of the Marsh checked at Ngulia, Kenya, the legs were dark brown. Reed typically have dark legs tinged greenish or purplish grey, but in some birds they are pale. This character seems, therefore, to be of little use in separation.

Mouth colour is yellowish-orange in Marsh Warblers as compared with a deeper orange in Reed. However, there does seem to be variation, and it is difficult to judge colour precisely in an individual bird, so that again, this is a character of limited use, even in the hand (see also Harvey & Porter 1984, Kelsey 1985).

SUMMARY

The separation of Reed and Marsh Warblers in the hand in eastern Africa can often be based on plumage colour and wear alone, especially in spring adults. First autumn birds are usually separable on plumage when fresh, but less readily in late autumn, when worn. Adult Marsh are quite distinctive after the autumn body moult. Three additional useful

Table 6. *Bill length from rear of nostril to tip (L), width across rear of nostril (W), length to width ratio, and length minus twice width in Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *caught in Kenya (measurements in mm). Ranges are given for the numbers indicated. Samples include adults and first year birds.*

	n	L	W	L/W	L–2W
Reed Warbler	139	9.9–12.5	3.7–4.8	2.3–3.1	1.5–4.3
Marsh Warbler	153	8.8–11.0	4.0–5.1	2.0–2.4	–0.2–1.9

Note: only 17/139 Reed Warblers had bill length <10.5 mm; only 12/153 Marsh had bill length >10.5 mm.

Table 7. *Inner footspan (mm) of Reed Warblers* Acrocephalus scirpaceus *and Marsh Warblers* A. palustris *caught in Kenya. Means ± s.d. and ranges are given for the number of birds shown in parentheses.*

Reed Warbler	19.0 ± 0.7	17.5–21.0	(121)
Marsh Warbler	17.4 ± 0.6	16.0–18.5	(139)

Note: only 1/121 Reed Warblers measured <18 mm; only 8/139 Marsh measured >18 mm.

identification checks seem to be available, any one of which may be conclusive. These are:

1. Second primary notch position. This separates practically all adults. Birds with notch below the tip of P9 will be Reed; notch equal to or above the tip of P8, Marsh. In first autumn birds, only those with notch below P9 (Reed) or above P7 (Marsh) should be assigned.

2. Bill length/width ratio. This identifies most birds. A ratio of 2.5 or above indicates Reed; 2.2 or below, Marsh. Alternatively, a value for (L – 2W) of 2.0 mm or above indicates Reed; 1.4 mm or below, Marsh.

3. Inner footspan. This separates many birds. A measurement of 19 mm or above indicates Reed; 17 mm or below, Marsh.

FIELD IDENTIFICATION

The separation of Reed and Marsh Warblers in the field depends on subtle features of plumage and jizz, and on voice. It has been much discussed with regard to the situation in Europe (Atkins *et al.* 1965, Wallace 1978, Dowsett & Dowsett-Lemaire 1979, Grant 1980, Pearson 1981, Harvey & Porter 1984). Here, the olivaceous appearance of adult Marsh as opposed to the warm look of Reed can be readily appreciated in the field. Marsh appears generally paler and more uniform above, accentuating the contrast shown by the dark tertial centres (M.G. Kelsey pers. comm.), while in Reed, the darker cap contrasts more strongly with the white throat. In autumn, the situation is complicated in adults by plumage wear, and many young Marsh are warmly tinged above. However, birds which

are clearly greenish above or yellowish below should be identifiable as Marsh.

In eastern Africa (and parts of the Middle East) the preponderance of *fuscus* Reed poses a further problem. Even in fresh plumage, these look similar in colour to Marsh above, and at least as pale on the head, and the warmer rump may not be obvious. The yellower underparts of Marsh, and the pale throat, contrasting against the deeper tinged breast, provide the best plumage features; the underparts of *fuscus* are particularly white.

Dowsett & Dowsett-Lemaire (1979) have stressed the rather less attenuated head and slightly shorter, stouter bill of Marsh, giving a subtly different profile, more like that of a *Hippolais* warbler, and this is re-emphasized by Komen (1988). With the crown feathers raised, the forehead of Marsh can look particularly steep. Other features of jizz and carriage have been variously commented upon. Marsh is a little more compactly built, less slender than Reed, and has been described as looking 'heavy bodied' and 'plump bellied.' M.G. Kelsey (*in litt.*) comments that on the breeding grounds Marsh tends to move through vegetation somewhat more heavily than Reed.

In Africa, head shape may be useful but it could rarely be taken as the sole basis for identification. In sleek postures, with feathers flattened, the head of Marsh can look as attenuated as in typical Reed. It is difficult to appreciate any consistent difference in build or carriage, especially in view of the large changes of fat content to which both species are subject. Harvey & Porter (1984) suggest that Marsh tends to perch more upright, but it usually forages, like Reed, with a horizontal carriage, the tail held level with the body line. The relatively long 'primary projection' of Marsh, with more widely spaced tips (Wallace 1978), is again not a feature of any value in the field, for the difference in wingtip structure of the two species is slight to non-existent. Many of these characters of jizz are probably only distinctive when, as during breeding, they are associated with particular displays and behaviour.

The best field distinction is provided by voice. The prolonged rapid warbling full song of the Marsh Warbler, with its silvery quality, high liquid trills and extensive imitative repertoire (Dowsett-Lemaire 1979) is unmistakable. Full Marsh Warbler song may be heard in birds which have broken their migration in Kenya in November/December, and is increasingly common in Africa from January to early April (Dowsett-Lemaire 1981, M.G. Kelsey pers. comm.). Reed Warblers produce their typical rhythmic song in Africa, usually somewhat subdued, from late November to early April. The commonest call of Marsh is a harsh *churrr*, slightly more buzzy and less grating than the similar note of Reed, and often introduced by a hard consonant, *t-churrr*. A chattering *ch-ch-ch-* is also common, and a hard *teck*, like the call of a *Hippolais* or *Sylvia*. The author has not knowingly heard this hard call given by a Reed Warbler in Africa.

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REFERENCES

Atkin, K. & Townsend, A.D.; Pyman, G.A.; Swaine, C.M.; Davis, P.; Ireson, G.M.; Moule, G.W.H.; Crudass, J. & Devlin, T.R.E. 1965. [= Atkin *et al.* 1965] Some comments on the problems of separating Reed and Marsh Warblers and The problems of separating Reed and Marsh Warblers—two sets of letters to the Editors. *British Birds* 58: 181–188, 473–478.

Crudass, J. & Devlin, T.R.E. 1963. *Rye Meads Annual Report for 1963*.

DORSCH, H. 1981. Morphologische Maße von Sumpf- und Teichrohrsänger (*Acrocephalus palustris* [Bechst.] und *A. scirpaceus* [Herm.]). *Zoologische Abhandlungen des Museums für Tierkunde Dresden* 37: 33–66.

DOWSETT, R.J. & DOWSETT-LEMAIRE, F. 1979. Reed and Marsh Warbler identification. *British Birds* 72: 190–191.

DOWSETT-LEMAIRE, F. 1979. The imitative range of the song of the Marsh Warbler *Acrocephalus palustris* with special reference to imitations of African birds. *Ibis* 121: 453–468.

DOWSETT-LEMAIRE, F. 1981. The transition period from juvenile to adult song in the Eurasian Marsh Warbler. *Ostrich* 52: 252–255.

DOWSETT-LEMAIRE, F. & DOWSETT, R.J. 1987. European Reed and Marsh Warblers in Africa: migration patterns, moult and habitat. *Ostrich* 58: 65–85.

GRANT, P.J. 1980. Identification of two first-winter Marsh Warblers. *British Birds* 73: 186–189.

HANMER, D.B. 1979. A trapping study of Palaearctic passerines at Nchalo, southern Malawi. *Scopus* 3: 81–92.

HARVEY, W.G. & PORTER, R.F. 1984. Field identification of Blyth's Reed Warbler. *British Birds* 77: 393–411.

KELSEY, M.G. 1985. Mouth and gape colours of singing Marsh and Reed Warblers. *British Birds* 78: 297–298.

KOMEN, J. 1988. Identity crisis: African Marsh, European Reed and European Marsh Warblers. *Bokmakerie* 40: 106–109.

LEISLER, B. 1971. Artmerkmale am Fuß adulter Teich- und Sumpfrohrsänger (*Acrocephalus scirpaceus*, *A. palustris*) und ihre Funktion. *Journal für Ornithologie* 113: 366–373.

PEARSON, D.J. 1973. Moult of some Palaearctic warblers wintering in Uganda. *Bird Study* 20: 24–36.

PEARSON, D.J. 1981. Identification of first year Marsh and Reed Warblers. *British Birds* 74: 445–446.

PEARSON, D.J. 1982. The migration and wintering of Palaearctic *Acrocephalus* warblers in Kenya and Uganda. *Scopus* 6: 49–59.

PEARSON, D.J. & BACKHURST, G.C. 1976. The southward migration of Palaearctic birds over Ngulia, Kenya. *Ibis* 118: 78–105.

SPENCER, R. 1972. *The Ringers' Manual*. 2nd edition. Tring: BTO.

SVENSSON, L. 1984. *Identification guide to European passerines*. 3rd edition. Stockholm: L. Svensson.

WALLACE, D.I.M. 1978. Mystery photographs 15 [Marsh Warbler]. *British Birds* 71: 122.

WILLIAMSON, K. 1976. *Identification for ringers 1. The genera Cettia, Locustella, Acrocephalus and Hippolais*. 3rd edition. Tring: BTO.

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